Forest Snow Damage in Northeastn Miyagi Prefecture

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Ryuichi YOTSU

Among forest disasters, such as forest fires, drought, storms etc., snow damage is one of the most frequent and disasterous, and is more severely damaging to planted forests than to natural forests. On the 15th and 16th of January 1972, there occurred a wet snow disaster in northeastern Miyagi Prefecture. This paper reports on forest damages by wet snow.

1 Forests in northeastern Miyagi Prefecture

Miyagi Prefecture has a comparatively smaller forest area than other prefectures in Tohoku. Forest areas in Miyagi Prefecture can be divided into those of the west and those of the northeast. The former is located in the Ou mountains and consists mainly of natural forest, belonging to the national government. The latter is mostly private forest and is famous for advances in afforestation of Sugi (*Cryptomeria japonica*) in Miyagi Prefecture. Tsuyama, the core place of the so-called Tsuyama Sugi has no national forest, and energetic foresters have planted since about 1900. Tsuyama Sugi has gained a high reputation all over the country for its lumber of high quality.

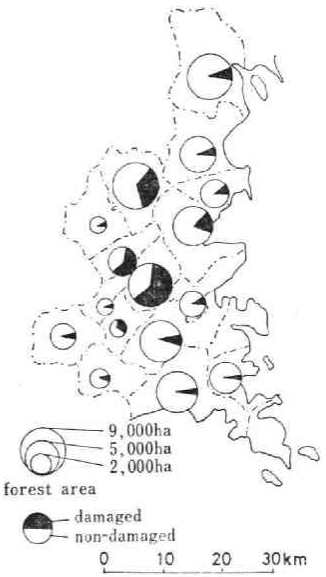
The wooded area in Tsuyama is 5.8 thousand ha, 85% of the total town area. Coniferous trees occupy 65% of the wood, and Sugi occupies 95% of the coniferous trees. The planting ratio of Sugi to the whole forest in this town is the highest in Miyagi Prefecture (Prefecture average 43%). Sugi is extensively planted not only in valleys but also along fairly steep slopes. In the core forest area, especially near the settlement of Ishikai, over 85% of the forest area is planted to Sugi.

Forest management is carried on with great care and the growing period is ordinarily 24 years, shorter than the prefecture average of 35 years.

2 Snow damage to the forest

(1) Distribution of snow damages

Wet snow on the 15–16th of January 1972, brought disaster to the eastern districts of Iwate and Miyagi Prefecture. In Miyagi Prefecture forest damages were distributed throughout Ishinomaki, Kesennuma and other 12 towns in the northeastern part of the prefecture. The most severely damaged areas were 3,364ha in Towa, 3,534ha in Tsuyama, 1,495ha in Tome and 1,069ha in Shizugawa, or, as percentages of forest areas in these towns, 65% in Tsuyama, 54% in Tome, 40% in Towa and 13% in Shizugawa.



Distribution of Forest Snow Disaster in Northeastern Miyagi Prefecture

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(2) The characteristics of forest damages by wet snow

Heavy rains were followed by wet snow which over-burdened the trees causing them to fall and snapping the trunks and branches. Even stout trees of over 20 years in age were felled. The broken stumps in the woods looked like white wooden tablets of a cemetry. The loss of wood in Tsuyama is estimated at 200 million yen and town people considered it the greatest forest disaster since the beginning of the town. Some differences in forest damage by snow are recognizable by type of tree; for example, coniferous trees were more severely damaged than broadleaf trees, because most of coniferous trees, being evergreen, retained the heavy snow on their branches. Thus, the most heavily damaged areas (63.5%) of Tsuyama coincide with coniferous tree forests.

Some broadleaf evergreen trees, such as Kunugi (*Quercus serrata*), also suffered damage from wet snow but such broadleaf trees are scarce in quantity.

3 Meteorological condition at the time of the snow disaster

According to the weather-chart of January 14, 1972, it was clear and warm (6.7°C higher than the mean temperature), but the next morning it began to rain and afterwards it snowed. It snowed heavily in the afternoon and 49 mm of

precipitation was recorded. This precipitation associated with a front located in southwestern Japan.

The precipitation was 225 mm in Kitakami, 163 mm in Onagawa, 150 mm in Shizugawa, 131 mm in Ishinomaki and 119 mm in Towa over the 24 hour period from 9.00 a.m., January 15th. The snow depth was 23 cm in Ishinomaki and the environs mentioned above, and the snow had a high water content similar to the snows of early spring.

The snow depth could not be surveyed in the mountainous region, but much more snow can be assumed than in the lower plains.

4 Aftermath of the forest snow disaster

(1) Temporary measures

Damaged wood in the northeastern region was equal in quantity to annual building lumber requirements of Miyagi Prefecture. The use of Sugi (*Cryptomeria japonica*) is mainly for construction, but is also valuable for other miscellanous uses. Damaged wood could not be used as lumber for construction, but only as wood chips for the paper and pulp industry, resulting in a low profit.

The prefectural authorities requested the two factories located at Ishinomaki and Iwanuma in Miyagi Prefecture to buy the damaged timber for wood chips, and this request was accepted in part. However, some of the damaged wood could even be used for wood chips. And the rest could not be used because of the high transportation cost. In the snow damaged regions the decrease in income from the forest was considerable.

There was a labour need to recover from the snow disaster, for instance, to cut the damaged wood in order to promote the growth of the remaining wood, or to raise the fallen trees.

This work required the skill of professional foresters, but, with the exception of Ishinomaki and Onagawa, this is an area of sparse population, so that the labour requirement were very difficult to supply.

Under such urgent conditions, the local governments called for the help of the Self-Defense Forces, and the following numbers of troops were called in: 3,000 in Kesennuma; 2,600 in Towa, especially in the Yonekawa area; 1,500 in Tsuyama; 1,300 in Toyoma; and 500 in Shizugawa.

(2) Long-run measures

Forest damage is different from farm crop damage. Its influence increases over time, and in some cases it may be tragic. Damaged wood becomes, if dried, more susceptible to fire. Entry to damaged forests is therefore strictly prohibited.

For the long-run recovery of damaged forest and forestry, the local government established consultant offices in Ishinomaki and Hasama.

5 Summary

In snowy regions, Sugi becomes adapted to the environment, but in regions without snow it grows without flexibility for snowfall. When it snows heavily in the regions normally without snow, the forest damage is abnormally severe.

This snow disaster was extremely hard on life in the mountain villages, particularly considering the modern depopulation trend. Further research is necessary to clarify the changes in the life of the mountain village.

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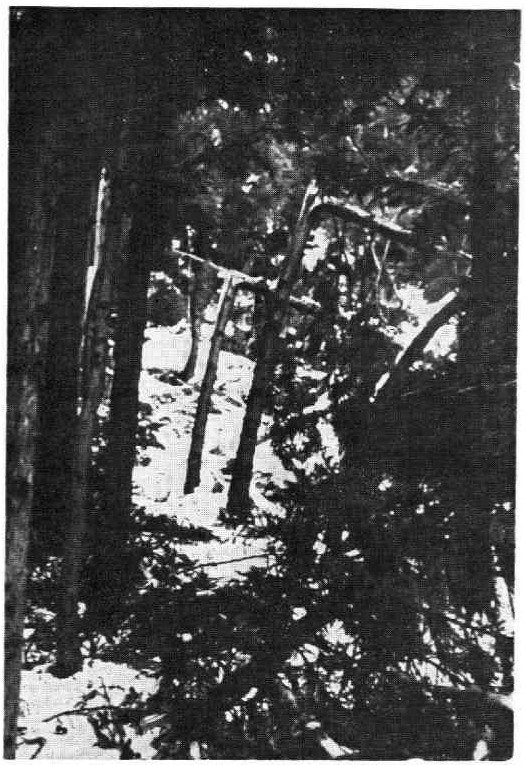

Photo 1 Ten year old growth of Sugi (*Cryptomeria japonica*) under forest management at Oyanaizu in Tsuyama

Photo 2 13 year old Sugi at Oyanaizu in Tsuyama

Photo 3 18 year old Sugi at Oyanaizu in Tsuyama

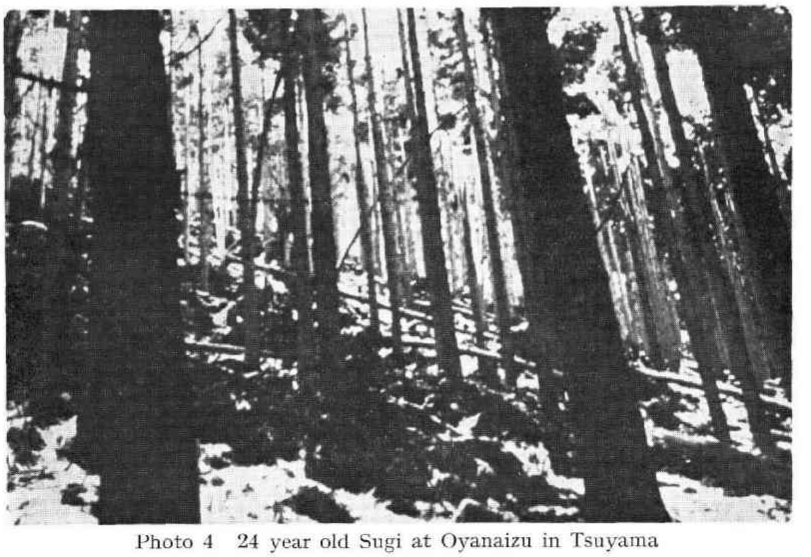

Photo 4 24 year old Sugi at Oyanaizu in Tsuyama